



# Chronic Stress Biomarkers and Optimal Workloads

## Status

*Title: Biomarkers of Immune Dysfunction in Response to Chronic Stress, Methods of Use and Diagnostic Kits*

*Patent Application: PCT/US13/000097 filed 3/28/2013*

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For  
Licensing**

**The Army seeks a partner interested in commercializing this technology**

## The Technology

Stress impacts gene expression, behavior, metabolism, and other functions, including the immune system. Chronic physiological and psychological stresses are known to impair protective immunity towards infection leading to an increase susceptibility to illness. The current invention provides a comprehensive description of specific molecular responses to stress via biomarkers, which allows for greater insight into how a subject is responding to chronic stress. Such information can be used, for example, to improve the adaptation to stress (i.e., the training effect) through scientifically managing an optimal exposure level to stress over a given time period for an individual and activity.



## Application

Some training and operational situations call for the maximum stress tolerable provided that (1) adaption will occur for the desired training effect; and (2) negative consequences, such as injury or illness, are avoided. Predicting where the line is between optimal training/stress and over-training/stress is typically based on subjective, secondary observations (e.g., sleep quality, resting heart-rate, etc.) as opposed to direct measures of biomarker activity. The present technology offers a robust, scientific approach to provide a better determination of optimal training/stress levels for use in command/management decisions as well as preventative, prognostic and therapeutic applications.

## Benefits

- Could be used in a kit form by special forces, competitive athletes, and the like to determine optimal training levels for the best possible performance.
- Applicable to high-stress professions to prevent burnout, and could be employed as a screening tool for entry into such occupations that involve high physical and/or mental stress.
- May offer a superior product or improvement to new blood testing services/kits that have recently come to market (for some examples, see article in *Outside Magazine*, Feb 2013, entitled BODYWORK.)

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